

CLAIMS:

1. A macromonomer of polyethylene glycol having repeat units in the range 6-300 and having at least one end terminated by an ether group having the formula:



where m is an integer of 0-10, a is an integer of 1-4, and

R is H or alkyl or aryl or arylalkyl;

or having the formula



where m is an integer of 1-10, and

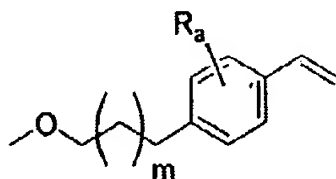
R is H or alkyl or aryl or arylalkyl.

2. A macromonomer having the structure:



where n is a real number of 6-300,

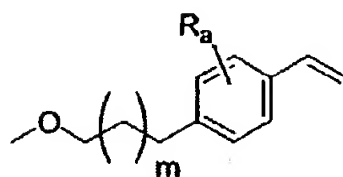
and where X and Y each independently is a group of the formula



where a is an integer of 1-4, m is an integer of 0-10, and R is H or

20 alkyl or arylalkyl,

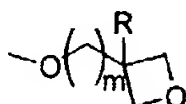
or where X is -OH, and Y is a group of the formula



where a is an integer of 1-4, m is 0-10, a is as defined above, and R is

5 H or alkyl or aryl or arylalkyl,

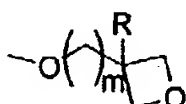
or where X and Y each independently are a group of the formula



where m is an integer of 1-10, and R is H or alkyl or aryl or arylalkyl,

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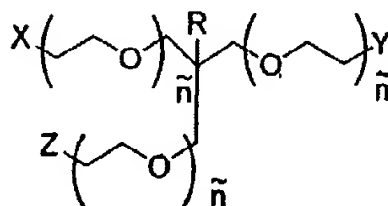
or where X is -OH, and Y is a group of the formula



where m is an integer of 1-10, and R is H or alkyl or aryl or arylalkyl.

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3. A macromonomer having the structure:

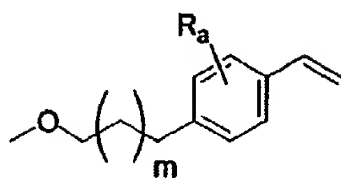


where R is H or alkyl or aryl or arylalkyl,

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and \tilde{n} is a real number of 6-300 as defined above

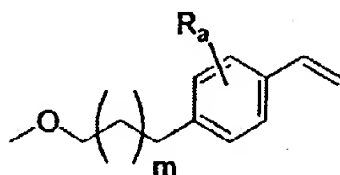
and where X, Y and Z each independently is OH or a group of the formula



where a is an integer of 1-4, m is an integer of 0-10, a is as defined

5 above, and R is H or alkyl or aryl or arylalkyl,

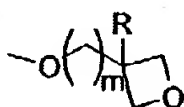
provided that at least one of X, Y or Z is a group of the formula



where a is an integer of 1-4, m is an integer of 0-10, a is as defined

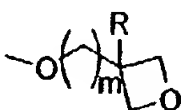
10 above, and R is H or alkyl or aryl or arylalkyl,

or where X, Y and Z each independently is are OH or a group of the formula



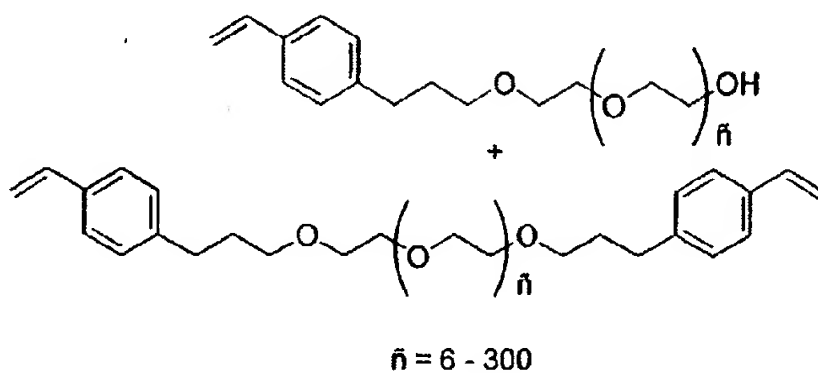
15 where m is an integer of 1-10, a is as defined above, and R is H or alkyl or aryl or arylalkyl,

provided that at least one of X, Y or Z is a group of the formula



where m is an integer of 1-10, a is as defined above, and R is H or alkyl or aryl or arylalkyl.

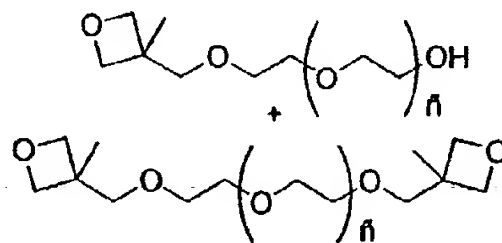
4. A macromonomer according to claim 2 which is terminated by a vinylphenylpropyl group and has the formula:



where R_a and m are as defined in claim 1.

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5. A macromonomer according to claim 2 which is terminated by an 3-methyloxetan-3-ylmethyl ether group and has the formula:



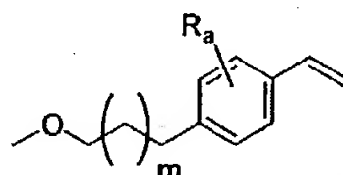
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where $\bar{n} = 6-300$

where R and m are as defined in claim 1.

6. A macromonomer according to claim 5, which has been acetylated or in other ways temporarily hydroxyl-protected on free hydroxyl groups.

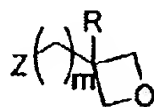
7. A process for the preparation of the macromonomers of claims 1 or 2 comprising
5 reacting an alkali metal derivative of a polyethylene glycol having 6-300 repeating units with a halo substituted compound having the formula:



where Z is Cl, Br, I, toluenesulfonyloxy or CF_3SO_3

10 and where a is an integer of 1-4, m is 0-10 and R is H or alkyl or aryl or arylalkyl

or having the formula



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where Z is Cl, Br, I, toluenesulfonyloxy or CF_3SO_3

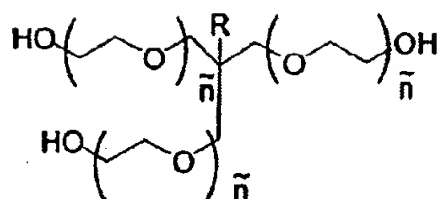
and where m is an integer of 1-10, and R is H or alkyl or aryl or arylalkyl

8. A process for the preparation of the macromonomer of claim 3 comprising reacting
20 an alkali metal derivative of a polyethylene glycol having the formula: -

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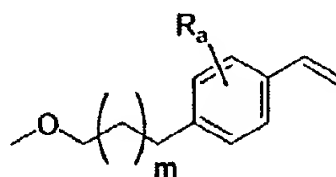
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where R is H or alkyl or aryl or arylalkyl and \tilde{n} is 6-300

with a halo substituted compound having the formula:

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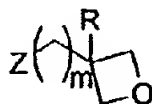
where Z is Cl, Br, I, toluenesulfonyloxy or CF_3SO_3

and where a is an integer of 1-4, m is 0-10, and R is H or alkyl or aryl or

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arylalkyl

or having the formula



where Z is Cl, Br, I, toluenesulfonyloxy or CF_3SO_3

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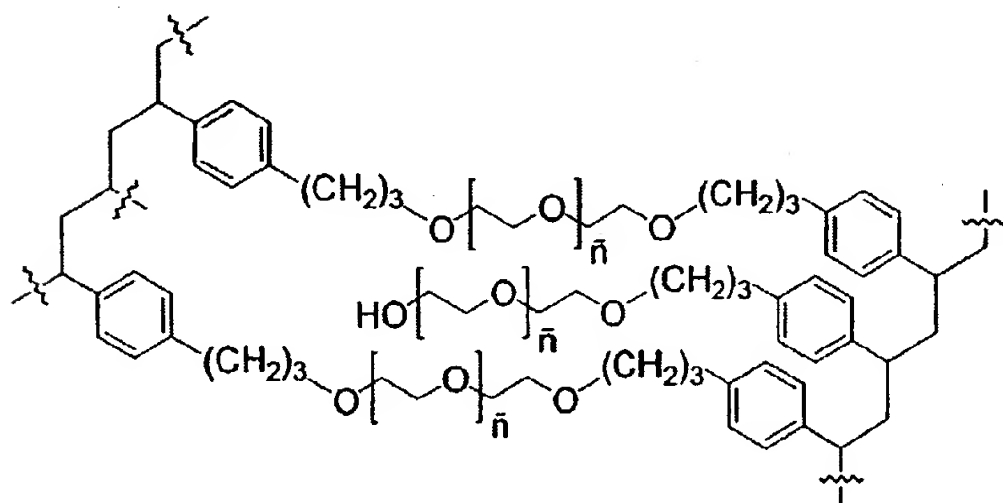
and where m is 1-10 and R is H or alkyl or aryl or arylalkyl

9. A process according to claims 7 or 8 wherein the alkali metal derivative is a sodium derivative.

20 10. A process according to claims 7 or 8 wherein the alkali metal derivative is a potassium derivative.

11. A cross linked polymer formed by the polymerisation of a macromonomer according to claim 2.

5 12. A cross linker polymer according to claim 11 wherein the macromonomer has the structure as claimed in claim 4, the polymerisation being initiated by a free radical catalyst and the polymer structure is represented as follows:

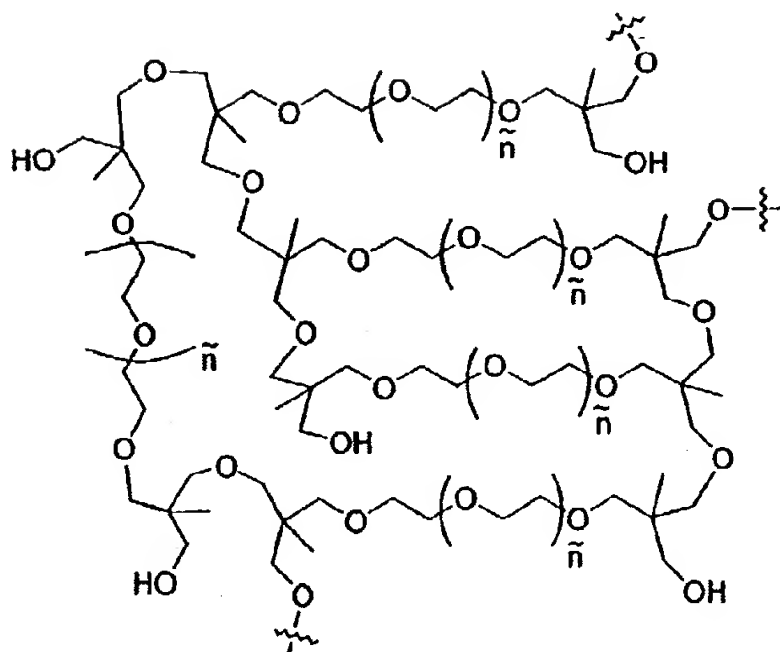


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where $\bar{n} = 6-300$

where R_1 and m are as defined in claim 1.

13. A cross linked polymer according to claim 11 wherein the macromonomer has
15 the structure claimed in claim 5, the polymerisation is initiated by a cationic catalyst and the structure of the polymer may be represented by the structure:



where $\bar{n} = 6-300$

5

where R is as defined in claim 1.

14. A crosslinked polymer according to claim 11 wherein the macromer used for its preparation has the structure of claim 6 and the per-O-acetylated or in other ways

10 temporarily hydroxyl-protected polymer structure analog to the hydroxylated structure of claim 13 is obtained.

15. A cross linked polymer formed by the bulk polymerisation of a macromonomer of claim 3.

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16. A beaded crosslinked polymer according to claim 12 made by reverse suspension- or spray polymerization

17. A beaded resin according to claim 13 or 14 formed by polymerization of droplets in silicon oil.
18. A beaded resin according to claim 13 or 14 formed by spray polymerization in a hot inert gas.
19. The use of polymers prepared according to claim 11 as supports for organic synthesis.
20. The use of polymers prepared according to claim 11 as supports for solid phase enzyme reactions.
21. The use of polymers prepared according to claim 11 as supports for synthesis of peptides, DNA, RNA and oligosaccharides.
22. The use of polymers prepared according to claim 11 as supports for peptide-, protein-, DNA- or RNA-ligation.
23. The use of polymers prepared according to claim 11 for chromatographic separations.
24. The use of polymers prepared according to claim 11 for affinity purification.
25. The use of polymers prepared according to claim 11 for protein immobilisation

26. The use of polymers according to claim 20 in which the enzyme interact with a substrate or an inhibitor linked to the support.

27. The use of polymers according to claim 11 in which the use involves release of a
5 drug bound to the solid support.

28. Release of a drug according to claim 27 where the release is mediated by an enzyme.

10 29. The use of polymers according to claim 11 for solid phase magic angle spinning NMR-spectroscopy.

30. The use of polymers according to claim 11 for combinatorial chemistry.

15 31. A beaded polymer according to claim 11 formed by suspension polymerization in silicon oil.

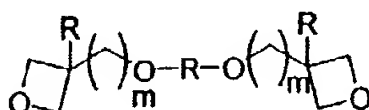
32. A beaded polymer according to claim 31 where the beads are stabilized by a surfactant

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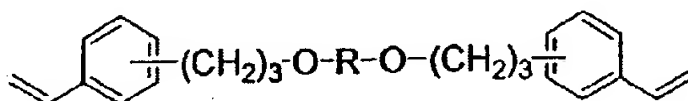
33. A beaded polymer according to 32 where the surfactant is obtained by radical polymerization of a mixture of acryloylated PEG-OMe and acryloyl propyl pentamethyl disiloxane.

34. A polymer according to claim 11 with addition of a short temporary crosslinker which may at a later point in time be selectively cleaved to result in expansion of the resin.

5 35. A polymer according to claim 34 where the short crosslinker has the structure⁻



or



10 Where R is a alkyliden, aryliden, silane, siloxane thioether or ether bridge chemically susceptible to selective cleavage conditions.

36. A macromonomer according to claim 1-6 prepared according to claim 7 or 8 but with the inversion of electrophile and nucleophile so that the tosylate or triflate or
 15 halide of PEG is prepared and reacted with the metal alkoxide of 3-methyl-oxetan-3-yl methanol or vinylphenylpropanol.